Quiz 3

• What is the difference between network layer and transport layer? (2 points)
  – Network is responsible for communication between hosts and transport is responsible for communication between processes.

• Compute utilization over a 100 Mbps path, 20 ms one-way propagation delay, 1000 byte packet using stop-and-wait (i.e., one packet outstanding). How to increase the utility? (4 points)

• Why do we need to perform congestion control? Name two reasons. (2 points)

• Why TCP performs poorly in wireless networks? (2 points)
Network Delay

• Transmission time
• Propagation time
• Queuing time
Quiz 3

• Compute utilization over a 100 Mbps path, 20 ms one-way propagation delay, 1000 byte packet using stop-and-wait (i.e., one packet outstanding) (4 points)
  – Tx time = 1000*8/100=80 microsec = 0.08 ms
  – Utilization = Tx/(Tx Time+total propagation) = 0.08/(0.08+20*2) = 0.001996

• Repeat the above using go-back-N where N=3 packets (2 points)
  – 0.001996*3 = 0.006
Quiz 3 (Cont.)

• Name two problems of network congestion? (2 points)
  – Increased delay, increased losses, decreased utilization

• Why TCP performs poorly in wireless networks? (2 points)
  – TCP assumes losses are due to congestion and reduces send rate upon losses. However, wireless networks have many non-congestion related losses.